A Satyam Roychowdhury initiative

TECHNOLOGICAL ANXIETY, PERCEIVED USEFULNESS AND ADAPTIBILITY AMONG RICKSHAW DRIVERS

The dissertation is submitted for the partial fulfilment for the degree of M.SC IN APPLIED PSYCHOLOGY

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CERTIFICATE

This is to certify that the dissertation entitled "TECHNOLOGICAL ANXIETY, PERCEIVED USEFULNESS AND ADAPTIBILITY AMONG RICKSHAW DRIVERS", submitted by Miss Debasmita Roy, a 4th semester M.Sc student in Applied Psychology, Sister Nivedita University, is a bona fide work, which may be placed before the board of examiners for their evaluation. This is in partial fulfilment for the Degree of M.Sc in Applied Psychology, Sister Nivedita University.

This is an original study done by the candidate and has not been submitted by her before in any form for any other degree of this University or any other University.

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DECLARATION

"I, DEBASMITA ROY, hereby declare that the research work titled "TECHNOLOGICAL ANXIETY, PERCEIVED USEFULNESS AND ADAPTIBILITY AMONG RICKSHAW DRIVERS", conducted by me, has been carried out with utmost honesty and integrity. I confirm that this study is an original piece of research, and all sources of information have been duly acknowledged and cited in accordance with academic standards.

Furthermore, I affirm that this research has undergone thorough plagiarism checks to ensure its authenticity and originality. I take full responsibility for the content, findings, and interpretations presented in this dissertation."

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ABSTRACT

This study explores the psychological and technological experiences of rickshaw drivers in South Kolkata, focusing on the interplay among technological anxiety, perceived usefulness, and adaptability. In an era of rapid digital transformation, this vital yet overlooked community faces unique challenges as traditional mobility methods are reshaped by app-based ride-hailing services and evolving urban infrastructures, impacting their routines, economic security, and social positioning. Using a quantitative, correlational research design, primary data were collected through standardized psychometric instruments, and descriptive and non-parametric statistical analyses were employed to explore the relationships among variables. Findings reveal that although moderate technological anxiety persists, significant adaptability emerges when tangible benefits of technology are perceived, highlighting perceived usefulness as crucial in mitigating anxiety and promoting digital acceptance. The study advocates for the development of a ride-calling app, inclusive policy initiatives, empathetic digital design, and targeted digital literacy programs to bridge the gap between technology and the informal sector. It ultimately aspires to honor the rickshaw driver community's contributions, resilience, and agency, offering insights toward a more equitable and humane model of digital integration in urban transportation.

Keywords: Technological Anxiety, Perceived Usefulness, Adaptability, Rickshaw Drivers, Digital Transformation, Urban Mobility, Informal Sector, Psychological Adaptation

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Chapter I

INTRODUCTION

INTRODUCTION

Among all developing nations, India stands out as the third most digitally advanced country globally, surpassed only by the United States and China (State of India's Digital Economy [SIDE], 2025). By harnessing a wide spectrum of digital technologies and innovative practices, India is not merely modernizing; it is actively reshaping its economic landscape, driving rapid growth, and cultivating a culture of forward-thinking progress. This digital revolution is evident in everyday life, as demonstrated by the societal benefits and reduced emissions reported by Schroders (2023). Technology integration spans several critical sectors—for example, digital solutions in transportation (including ride-hailing, smart traffic control, and logistics) account for roughly 10–12% of overall technology usage in the country. Driving this transformation further is the surge in digital transactions, with UPI penetration reaching an impressive 25% and smartphone adoption nearly doubling from 485.1 million in 2020 to 938.3 million in 2024. These developments not only enhance mobile connectivity but are also redefining how millions of Indians conduct their daily lives. Concurrently, India is undergoing a remarkable urban transformation as economic development drives people from rural areas to bustling cities in search of better job opportunities. This steady influx sparks a significant rise in passenger vehicle ownership, with urban centres emerging as hotspots of demand. A blend of factors—such as an expanding working population, rapid technological progress, and an increasing desire for an improved standard of living—converges to fuel this dynamic shift in urban mobility.

The Rise of Ride-Hailing Services in Kolkata and India

In the realm of urban mobility, the adoption of ride-hailing services (RHS) (also known as on-demand ride services) is particularly striking in India, offering commuters a convenient, affordable, and reliable alternative to traditional public transport. Companies like Uber and Ola, which entered the Indian market in the early 2010s (Ola in 2010 and Uber in 2013), have transformed mobility patterns and stimulated economic activity across the country. Leveraging smartphone applications, GPS tracking, and digital payment systems, these platforms have significantly enhanced user convenience. Ride-hailing services provide round-the-clock availability, allowing commuters to book rides from virtually any location using their smartphones. The introduction of various ride options, including budget-friendly shared rides and premium services, offers greater flexibility and accessibility. Moreover, these services have created economic opportunities for thousands of drivers, offering flexible work hours and

enabling many to earn a livelihood through the gig economy. This expansion of ride-hailing services not only improves urban mobility but also contributes to broader economic growth. Major metropolitan states across India—such as Delhi, with its expansive Delhi-NCR; Karnataka, anchored by the dynamic city of Bengaluru; Telangana, with Hyderabad at its core; Maharashtra, encompassing Mumbai and Pune; and West Bengal, where Kolkata thrives—register the highest levels of digital mobility. In these urban centres, platforms like Uber and Ola have become synonymous with efficient, app-based transportation, consistently emerging as the preferred choices for millions of commuters (SME Street Report, 2023). Now, as cities grow, they face persistent challenges. Rising pollution levels and strained road networks add to the complexity of the situation (Thondoo et al., 2020; Verma et al., 2021). In response, city planners and policymakers are focusing on developing effective and sustainable mobility solutions. Reliable public transportation systems, for instance, serve as the backbone of smart urban design by easing congestion and mitigating pollution through reduced reliance on private vehicles (Papadakis et al., 2024). Many cities are actively promoting nonmotorized options and public transit as attractive alternatives to address these challenges (Abdulrazzaq et al., 2020). These sustainable steps are pivotal in linking technological advancements with the practical, everyday needs of commuters.

In Kolkata—one of India's largest metropolitan cities—ride-hailing services have become an integral part of daily commuting, complementing the city's traditional yellow taxis and extensive public transport network. This integration has reshaped the urban mobility landscape, influencing the use of various para-transit modes. Among the private and para-transit modes of passenger transportation, three-wheeled vehicles play a crucial role in ferrying passengers. This sector comprises both motorized and non-motorized modes. The motorized forms include vehicles powered by internal combustion engines—typically fuelled by gasoline or diesel, such as auto-rickshaws—and those driven by electric motors, commonly known as battery-operated rickshaws. On the other hand, non-motorized transport (NMT) refers to vehicles that do not consume commercial energy, such as cycle-rickshaws or hand-pulled rickshaws.

The vehicles, often human-powered or electrically driven, produce minimal to zero emissions, making them a sustainable choice for navigating the city's narrow lanes and short distances. Serving a significant portion of Kolkata's 14 million residents, rickshaws offer an economical and accessible means of transport for individuals across various socio-economic backgrounds.

Their integration into the city's diverse mobility ecosystem underscores Kolkata's commitment to sustainable and inclusive transportation solutions.

Rickshaws and Their Relevance

\The word "rickshaw" comes from the Japanese term “jin-riki-sha”—with “jin” meaning human, “riki” meaning power, and “sha” meaning vehicle—which essentially translates to "human-powered vehicle" (Merriam-Webster, n.d.). In the 19th century, the British introduced rickshaws to India, featuring vehicles with large, iron-shod wooden wheels, a rubber-cushioned seat mounted on a wooden plank, and a tarpaulin shelter. Rickshaws first appeared in Shimla around 1880 and made their way to Kolkata by the turn of the century. Over time, traditional hand-pulled rickshaws evolved into cycle rickshaws and, more recently, battery-operated e-rickshaws, ensuring that this mode of transport remains accessible to everyone. Today, rickshaws are widely used, especially among the lower-middle, middle, and upper-middle classes, as they offer a convenient and affordable means of getting around.
In Kolkata, rickshaws can be broadly divided into two types: motorized and non-motorized. On the motorized side, auto-rickshaws—locally known as "autos"—usually run on LPG or CNG, though some suburban routes still use diesel-powered versions. An auto typically carries four passengers, although in some suburban areas, they may carry five to meet higher demand. Recently, the government has approved the use of electric auto-rickshaws, typically identified by their blue colour, to help reduce pollution. Additionally, battery-operated rickshaws, commonly known as "totos," have become increasingly popular in suburban regions. These electric three-wheelers, often powered by lead-acid or lithium-ion batteries, offer a cleaner alternative that helps lower the carbon footprint of passenger transport.
On the non-motorized side, the rickshaw category includes hand-pulled rickshaws—affectionately called “tana” rickshaws by locals—which are operated manually by strong individuals and are mainly found in the older parts of the city. Although the number of hand-pulled rickshaws in Kolkata has been declining over the years (approximately 3,500 were reported as of June 2024, according to Mukhtar Ali, general secretary of the All Bengal Rickshaw Union), they remain an iconic part of the city’s heritage as the only licensed hand-pulled rickshaws still in operation worldwide. Cycle rickshaws, another non-motorized option, are powered by pedalling and have largely replaced hand-pulled rickshaws in many areas. These vehicles are typically built with a front bicycle frame, an iron chassis, a wooden rear body, a spring, and a coir seat, serving as an eco-friendly option for short trips within local

neighbourhoods.

In essence, the evolution of the rickshaw in Kolkata is a compelling narrative of adaptation and resilience. Each variant, whether motorized or non-motorized, tells a unique story—one that bridges the past with the present and continues to shape the city's dynamic transport system. Despite these structural advancements, the integration of rickshaws into the digital ecosystem remains largely neglected. The e-commercialization of rickshaws has been absent till now

Digital Challenges, Changing Routines, and the Evolving Role of Drivers

Technological anxiety or digital anxiety describes the stress, unease, or apprehension people experience toward modern digital technologies, reflecting "feelings of tension and discomfort with respect to the emergence of new technologies." In simpler terms, it's the negative emotional response some individuals experience when faced with new gadgets or software that appear too complex, overwhelming, or beyond their control. Scholars like Ellul (1967) and Winner (1977) have long portrayed technology as enigmatic, increasingly powerful, and at times even uncontrollable—perceptions that serve as key drivers of this anxiety. In today's world, technology is ubiquitous, profoundly influencing how we live, work, and interact. Although it is widely regarded as a primary engine of economic progress, the rapid pace and inherent complexity of technological innovation have also engendered both cultural and individual anxiety, creating a gap between system complexity and daily tasks. Empirical studies indicate that up to 19% of people experience technology-related anxiety, a response attributable in part to significant drivers such as the relentless speed of change, escalating system complexity, and the constant need to adapt in an ever-evolving digital landscape. This duality underscores a modern paradox: while digital technologies—from mobile devices and network systems to communication platforms and various application tools—have revolutionized daily routines, they also challenge us to continuously adapt, often leaving some struggling to keep pace with an increasingly dynamic and demanding digital environment. Rickshaws have long served as the backbone of India's informal transport sector, supporting roughly 4% of the population given that each rickshaw puller typically supports a family of five (Robey & Farrow, 1982; Franz & Robey, 1986). Traditionally, these drivers leveraged their local knowledge by positioning themselves near hotspots such as bus stops, schools, or hospitals, using hand waves or shouts to negotiate fares based on real-time conditions like traffic and weather. However, with the advent of digital ride-hailing platforms such as Ola—and occasionally Uber—drivers now face a new set of challenges. They are required to respond

to digital alerts within a narrow window of 5 to 30 seconds, with the system providing only a general area for pickup and drop-off. This change strips them of the ability to negotiate fares using their local insights and lacks precise GPS support for the final 500 meters, leading to multiple phone calls to confirm exact locations and often resulting in ride cancellations if passengers are no longer waiting. When drivers experience steadier ride allocations and reduced waiting times, they tend to reconfigure their routes and schedules to fit the app's workflow—demonstrating that clear, tangible benefits encourage adaptation—whereas recurrent mapping errors or opaque fare structures quickly erode that willingness, underscoring that sustained adoption depends on both evident utility and user-friendly operation. In practice, those who see higher daily earnings and feel confident using the interface are more likely to stick with the platform, showing that perceived usefulness—defined as the degree to which an individual believes that using a particular system would be beneficial—and adaptability—the ability to adjust effectively to new, changing circumstances by learning new skills and modifying behaviours—go hand in hand.

At the same time, environmental pollution and energy crises have forced governments to seek sustainable solutions like electric vehicles (EVs) to reduce emissions and dependency on imported oil (Shang et al., 2024; Anenberg et al., 2019). Despite these efforts, both India and Australia have low EV adoption rates—around 1–2% of total vehicle sales (Malik, 2021; State of Electric Vehicles, 2021). A significant barrier to broader EV adoption is the anxiety experienced by potential users, manifesting as both range anxiety and technology anxiety (Rainieri et al., 2023; Baker & White, 2010). This anxiety is intensified by concerns over the charging infrastructure, as studies have shown that improvements in charging facilities can notably boost market share (Choi et al., 2018; Sierzchula et al., 2014). For instance, a study by the SwitchOn Foundation, as reported by the Times of India (2018), found that while about 60% of Kolkata's auto-rickshaw operators are willing to switch to electric vehicles, their transition hinges on receiving technical guidance, proper vehicles, substantial subsidies, and swift disbursal of loans. Yet even among those interested, actual uptake often depends on first-hand experience of lower running costs and the ability to plan charging stops without disrupting daily trips—highlighting that both perceived benefit and practical confidence shape drivers' decisions. Notably, 68% of these drivers already have some awareness of electric auto-rickshaws, suggesting that while the promise of EVs is recognized, intrinsic fears and uncertainties regarding new technology—combined with practical concerns about driving range and the reliability of digital systems—continue to hinder adoption.

The Bigger Picture

By integrating factors such as environmental propensity, subjective norms, technological anxiety, and perceived behavioural control into models like the Theory of Planned Behavior (Ajzen, 2016; Wang et al., 2024), policymakers and marketers can gain deeper insights into these barriers (Sheng et al., 2021; Mathew et al., 2013). This enriched framework not only captures the drivers' anxiety over new digital platforms and EV technologies but also highlights the perceived usefulness of these innovations, paving the way for targeted interventions to accelerate the adoption of cleaner, more efficient transport solutions in diverse markets. Kolkata's rickshaw sector now stands at a pivotal juncture—negotiating a rich cultural heritage alongside rapid technological change. The city's challenge and opportunity lie not only in advancing sustainable, low-emission transport but also in fostering digital inclusion for every driver. Addressing psychological barriers, improving charging and network infrastructure, and aligning platform systems with on-the-ground realities will help ensure that rickshaw operators remain active partners in shaping a smarter, greener, and more equitable urban mobility landscape.

Theoretical Foundation

In today's fast-changing digital world, it's not uncommon for people to feel uneasy or even stressed when they have to deal with new technologies. This feeling is often referred to as technological anxiety. It shows up in different ways—some people might avoid using apps or digital platforms altogether, while others may struggle with them despite having access. Meuter et al. (2003) pointed out that technological anxiety can actually stop people from using self-service technologies, and that higher levels of anxiety often lead to lower usage and less satisfaction. This kind of anxiety includes not just mental discomfort, but also behavioral hesitation and even physical reactions to things like complicated apps or rapid tech updates. To understand why some people adopt technology more easily than others, one important concept is perceived usefulness. This idea comes from Davis's (1989) Technology Acceptance Model (TAM), and it basically means how helpful someone believes a system or app will be in getting their work done. If people feel that a certain technology will make their life easier or help them do tasks better, they're more likely to use it. Davis showed that this belief acts like a bridge between how the system is designed and whether people actually end up using it. Since then, many studies have shown that perceived usefulness is a solid and reliable factor when it comes to predicting technology use in different settings.

Another key idea here is adaptability, which refers to how well a person can adjust their thoughts, feelings, and actions when faced with new or uncertain situations. Martin et al. (2012) explained adaptability as the healthy and flexible regulation of how we think, feel, and behave when things change around us. Their research found that adaptability can be broken down into parts—like how people think and feel during changes—but also works well as a single, overall score. People with higher adaptability tend to be more emotionally balanced, more engaged in tasks, and more satisfied with life, even when things are unpredictable. These three ideas—technological anxiety, perceived usefulness, and adaptability—help explain why people react differently to digital platforms. Someone who isn't too anxious about technology, sees real benefits in using it, and can adapt well is more likely to adopt and use new tools effectively. Putting all these concepts together gives us a better understanding of how to create user-friendly technology and training programs. Such efforts can help reduce anxiety, clearly show the advantages of technology, and support people in learning and adjusting to digital changes.

Chapter II

REVIEW OF LITERATURE

In his 1989 paper, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," Davis explored how people's perceptions of a system's usefulness (PU) and ease of use (PEOU) influence whether they actually use it. He carried out two survey-based studies with 152 participants. Anchored in the Technology Acceptance Model (TAM), the study proposed that both PU and PEOU would positively affect system usage. Findings showed that perceived usefulness had a stronger link to system use (r = .63, .85) than ease of use (r = .45, .59). Davis's work was foundational in showing how user perceptions drive technology adoption, perhaps making systems more useful and easier to use can boost user acceptance across different tech environments. However, it did have some limits—mainly relying on self-reported data from a narrow range of software types, making the results less widely applicable.

Venkatesh and colleagues (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT), to create a more complete framework for understanding technology adoption. Their longitudinal study, which surveyed employees from four organizations and used Structural Equation Modeling (SEM) for analysis, pulled ideas from models like TAM, TPB, and TRA. They proposed that performance expectancy, effort expectancy, social influence, and facilitating conditions predict technology use. Their results were impressive—UTAUT explained 70% of the variance in behavioral intention, with performance expectancy standing out as the biggest factor. While the study gave organizations a powerful tool for boosting tech acceptance, it focused mainly on mandatory workplace settings, which could make it less relevant for voluntary tech adoption scenarios. Even so, the insights have been hugely valuable for businesses trying to encourage technology uptake among their staff.

In their 2023 meta-analysis, "User Anxiety as an External Variable of Technology Acceptance Model," Dönmez-Turan and Kır took a deep dive into how user anxiety affects technology acceptance. Pulling data from 46 studies and more than 11,000 participants, they used Comprehensive Meta-Analysis software to crunch the numbers. They hypothesized that anxiety would have a negative impact on both perceived usefulness (PU) and perceived ease of use (PEOU), and that's exactly what they found: a small negative effect on PU ($\bar{r}$ = -0.139) and a moderate negative effect on PEOU ($\bar{r}$ = -0.291). One limitation was that they only pulled studies from the SCOPUS database, which might have narrowed the range of research considered. Still, their findings clearly underscore how important it is to address user anxiety

when designing and rolling out new technologies, especially for older adults or people who aren't naturally comfortable with tech.

Wilson and his team (2023) set out to create a simpler way to measure anxiety toward digital technologies, leading to the development of the Abbreviated Technology Anxiety Scale (ATAS). They followed a multi-phase process to design and validate the scale, using surveys completed by undergraduate students and running Confirmatory Factor Analysis (CFA). They ultimately landed on an 11-item scale that proved highly reliable ($\omega = 0.95$). The results confirmed their hypothesis that higher tech anxiety correlates with lower self-efficacy and more negative tech attitudes ($r = -0.47$ and $r = -0.65$, respectively). While the tool showed strong potential, the relatively uniform student sample does raise questions about how well the findings apply to broader groups. Still, the ATAS offers a compact, validated way for educators and organizations to better understand and tackle technology-related anxiety.

Razavi and colleagues (2024) adapted and validated the Persian version of the Abbreviated Technology Anxiety Scale (ATAS) among university students in Iran. Using a cross-sectional survey of 1,158 participants, they ran both Exploratory and Confirmatory Factor Analyses (EFA and CFA) and confirmed a two-factor structure: Technology Change Anxiety and Technology Incompetence Anxiety. The adapted scale showed excellent reliability, with Cronbach's alpha at 0.96, and good concurrent validity with the CAS scale ($r = 0.51$). However, because the study was limited to students from Bandar Abbas, its findings may not easily extend to other groups. Even so, the Persian ATAS gives Iranian universities a strong tool to help spot and support students facing challenges with technology anxiety.

Tsai et al. (2020) conducted a study on "Technology Anxiety and Resistance to Change: Study of a Wearable System" to investigate how technology anxiety (TA) and perceived ubiquity (PUb) impact resistance to change among older adults adopting wearable health systems. Using a cross-sectional survey with 81 older participants and analyzing data through Partial Least Squares Structural Equation Modeling (PLS-SEM), the study tested hypotheses linking TA, PUb, perceived usefulness (PU), and perceived ease of use (PEOU). Findings revealed that TA negatively affected PEOU, while PUb positively influenced both PU and PEOU. The hypothesis concerning resistance to change was not supported. The limitation of the study was the small sample size and artificial trial settings. The implication stresses designing more intuitive and comfortable wearable technologies to enhance adoption among older users.

Meuter et al. (2003) explored the role of technology anxiety in influencing the use and satisfaction of self-service technologies (SSTs) among consumers. A survey was conducted with 823 participants recruited from an online panel, with data analyzed through multiple regression and correlation analyses. The hypothesis proposed that technology anxiety negatively predicts SST usage, satisfaction, and loyalty. Results confirmed negative correlations across all relationships, reinforcing the idea that anxiety is a barrier to SST adoption. The theoretical framework involved models of service technology adoption. A limitation includes potential online sampling bias and the absence of longitudinal assessment. Implications suggest that firms must address user anxieties to foster greater acceptance and satisfaction with self-service platforms.

Fongang (2024) examined the relationship between smartphone usage and anxiety-based performance deficits among rideshare drivers. Using a quantitative correlational research design, the study surveyed 132 drivers through online questionnaires, analyzed via Spearman's rank correlation. The hypothesis tested that smartphone activities such as texting and calling positively correlate with anxiety-related performance deficits. Results showed strong positive correlations (texting rs = 0.57; calling rs = 0.59), supporting the hypothesis. The study draws from models of driver distraction and performance. A key limitation was the self-report bias and limited geographical focus on Southeastern Massachusetts. Implications stress the urgent need for policy interventions to restrict smartphone use during rideshare driving to enhance operational safety.

Bolodeoku et al. (2022) assessed the perceived usefulness of technology and its impact on multiple organizational outcomes in the oil and gas sector. Conducted through a descriptive survey of 495 employees using stratified random sampling, data were analyzed via SEM-PLS. Rooted in the Technology Acceptance Model (TAM), the study hypothesized that perceived usefulness would positively impact satisfaction, productivity, perceived organizational support, and commitment. Results confirmed positive effects, with satisfaction (9.2%) and productivity (8.8%) most significantly influenced. However, organizational commitment showed a weaker effect (5.7%). A limitation was the sector-specific focus, potentially limiting generalizability. The findings imply that organizations must leverage perceptions of technology usefulness to boost employee engagement and performance outcomes.

Sun et al. (2024) explored the mediating roles of technology interactivity and anxiety in the relationship between perceived usefulness and willingness to use smart healthcare devices among older adults. A cross-sectional survey was administered to 552 Chinese older adults, analyzed using Structural Equation Modeling (SEM) with bootstrapping. The framework integrated technology acceptance and mediation models. The hypothesis proposed that perceived usefulness affects willingness indirectly through interactivity and anxiety. Findings confirmed complete mediation, indicating that increasing device interactivity and reducing anxiety are crucial for promoting adoption. Limitations include a geographically restricted sample and the exclusion of device-type differentiation. The study implies that developers should prioritize usability and anxiety-reducing features to increase smart healthcare device acceptance among aging populations.

Pulakos et al. (2000) introduced a framework to understand how adaptability is a critical aspect of job performance. The study employed a two-phase design, starting with a critical incident technique that collected 1,311 incidents, followed by a survey involving 3,411 employees. Through Exploratory and Confirmatory Factor Analyses, the study aimed to demonstrate that adaptability is a measurable and separate component of job performance. The findings revealed eight key dimensions of adaptability, which were validated across a range of jobs, supporting the idea that adaptability plays a unique role in performance. However, the study had a limitation: some industries were underrepresented, which might affect how applicable the results are across all sectors. The study underscores the importance for organizations to prioritize adaptability in their hiring, training, and performance evaluation processes to effectively navigate an ever-changing work environment.

Martin et al. (2013) explored how adaptability affects both academic and emotional outcomes among students. Conducted as a longitudinal study of 969 high school students in Australia, the research utilized Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA) to analyze the data. Grounded in theories of adaptability and self-regulation, the study hypothesized that students with higher adaptability would show improved academic engagement and emotional resilience. The results supported this, showing that greater adaptability was associated with stronger academic intentions, higher self-esteem, and reduced disengagement. However, a limitation of this study was its focus on the Australian education system, which may limit the generalizability of the results to other cultural or educational contexts. The findings suggest that schools should consider implementing adaptability training

programs to help students not only succeed academically but also manage emotional challenges more effectively.

Aneetta (2023) conducted a sociological study to investigate the socio-economic conditions of auto rickshaw drivers in Vypin, Kerala. Using a mixed-methods approach, including both surveys and interviews with 100 randomly selected drivers, the study aimed to explore the impact of urban transport changes on the livelihoods of drivers. The hypothesis posited that transformations in urban transport have negatively affected the financial stability of drivers. The findings revealed substantial financial instability, a heavy reliance on daily earnings, and limited awareness of welfare programs among the drivers. The study drew on theories of occupational sociology. A limitation of this research was that its geographical focus on Vypin restricts the ability to apply the findings to other regions. However, the study emphasizes the pressing need for effective policy interventions and better dissemination of welfare programs to support informal workers in the transport sector.

Majumdar and Jash (2015) evaluated the potential of e-rickshaws to promote sustainable transport in West Bengal. Using a case study approach, the researchers surveyed drivers and passengers while also measuring energy consumption. The hypothesis proposed that e-rickshaws would be more energy-efficient and environmentally friendly than traditional modes of transport. The results confirmed that e-rickshaws used less energy per kilometer and produced fewer emissions, making them a more sustainable option. However, challenges such as legal ambiguities, safety concerns, and informal vehicle assembly processes hinder the widespread adoption of e-rickshaws. The study suggests that for e-rickshaws to reach their full sustainable potential, regulatory frameworks and technical standards need to be established.

Halder and Sarkar (2021) explored the socio-economic factors influencing the spending habits of auto rickshaw drivers in Kolkata. A survey of 392 drivers, analyzed using multiple regression techniques, aimed to understand how socio-demographic variables impact drivers' expenditures. The hypothesis was that factors such as age, family size, and income level would significantly influence spending patterns. The study found that drivers working longer hours, with children attending private schools, or operating on more profitable routes had higher expenditures. A limitation of this research was its focus on Kolkata, which means that the findings may not be applicable to other urban contexts. The study suggests that targeted welfare programs and financial planning support are crucial for drivers in the informal transport sector.

Majumdar (2019) investigated the role of auto-rickshaws in Kolkata's urban mobility system through a study titled "Para-Transit Modes: Boon or Bane of Kolkata City." Relying on secondary data and spatial analysis, the study assessed how auto-rickshaws contribute to and complicate the city's transport system. The hypothesis suggested that while auto-rickshaws are crucial for short-distance travel, they also contribute to traffic congestion and pollution. The findings confirmed that auto-rickshaws provide essential transport services but also exacerbate traffic issues and environmental degradation. However, a limitation was that the study did not compare the situation in Kolkata with that of other Indian cities, so the results might not apply universally. The study calls for a more structured approach to integrating auto-rickshaws into formal urban transport planning to reduce their negative impact while maintaining their vital role in city mobility.

Sharma, Pandit, and Bose (2020) identified key service quality factors that matter most to paratransit users along the Eastern Metropolitan Bypass corridor in Kolkata. Using a survey of 500 commuters, the researchers applied RIDIT and Zone of Tolerance (ZOT) methods to evaluate how socio-economic factors influence customer satisfaction. The hypothesis was that people's socio-economic characteristics would affect how they perceive and value various service attributes. The results showed that safety, customer service, and operational hours were the top factors influencing commuter satisfaction. A limitation of this study was its geographic specificity, as it focused only on the Eastern Metropolitan Bypass corridor. The study's implications suggest that paratransit providers must improve safety and punctuality, among other service features, to stay competitive in a crowded transport market.

Tiwari (2014) examined the role of cycle rickshaws as important connectors for last-mile transportation in Indian cities, especially in complementing public transport systems. Using transport surveys, secondary data, and urban mobility planning models, the study hypothesized that cycle rickshaws help reduce the reliance on motorized vehicles by improving access to public transit hubs like metro stations. The findings supported the hypothesis, demonstrating that cycle rickshaws play a vital role in enhancing metro accessibility and reducing emissions. However, a limitation was the reliance on secondary data, which did not account for real-time mobility dynamics. The study suggests that urban planners should integrate non-motorized modes like cycle rickshaws into city transport plans to improve sustainability and accessibility.

Chandran and Brahmachari (2015) documented the development of the Soleckshaw, a solar-powered electric rickshaw, and assessed its impact through the lens of frugal innovation. Using

qualitative methods like stakeholder interviews and policy document analysis, the study proposed that grassroots needs can drive transformative technological innovations. The findings highlighted that the Soleckshaw initiative contributed to the widespread adoption of electric rickshaws, improving both urban transport sustainability and driver incomes. However, challenges such as initial scalability issues and dependency on external supply chains were noted. The study suggests that aligning technological innovation with local community needs fosters sustainable, inclusive development.

Olayode et al. (2023) conducted a systematic review of 160 studies to assess the global impacts of ride-hailing services on public road transport. Using the PRISMA method for data synthesis, the study hypothesized that ride-hailing services both complement and compete with traditional public transport systems. The findings revealed that while ride-hailing services enhance accessibility and flexibility, they often reduce public transit ridership and present regulatory challenges. A limitation of this study was that many of the analyzed studies were concentrated in developed countries, which may limit the global applicability of the findings. The study's conclusions call for adaptive transportation policies that balance the innovative aspects of ride-hailing with the preservation of public infrastructure and services.

RESEARCH RATIONALE

The significance of this study lies in addressing a crucial yet often overlooked aspect of urban mobility in India—the digital inclusion of rickshaw drivers. As cities increasingly adopt app-based transportation solutions, rickshaw drivers, who have been a backbone of informal transport for decades, are struggling to keep pace with these technological shifts. Whether operating hand-pulled, cycle, or battery-operated rickshaws, these drivers rely on personal experience and local knowledge, but now face challenges navigating systems that are not always designed with their needs in mind.

This study was motivated by a clear gap in understanding the psychological dimensions of this transition. Many digital platforms feature vague location details, strict time requirements, and complicated interfaces, causing stress and confusion among drivers with limited smartphone experience or formal education. As some drivers adapt while others experience technological anxiety or perceive little usefulness in these tools, this research focuses on three key factors—technological anxiety, perceived usefulness, and adaptability—to better understand how drivers interact with digital systems.

While modernization policies exist, few initiatives have explored how individual characteristics like age, education level, or type of rickshaw influence technology adoption. Without these insights, digital rollouts risk favoring a small tech-savvy minority while marginalizing many others.

Beyond academic contribution, this study serves a practical purpose: the findings will directly guide the development of a ride-hailing application specifically designed for rickshaw drivers, ensuring the app meets their real-world needs and capabilities. The region from Patuli to Jadavpur in Kolkata has been selected for the beta launch of this app, and rickshaw drivers from this area were chosen to participate in the study. This localized approach will allow developers to test and refine the application based on authentic user feedback before a broader rollout.

Ultimately, this study aims to support a more inclusive, accessible, and sustainable urban mobility future by empowering rickshaw drivers to meaningfully participate in the evolving digital transportation ecosystem.

Chapter III

METHODOLOGY

METHODOLOGY

Methodology refers to the systematic and logical framework adopted to investigate a research problem. It encompasses the selection, application, and justification of appropriate research methods and techniques, grounded in theoretical considerations. Methodology involves a philosophical inquiry into why certain methods are most appropriate for addressing specific research questions. This includes a critical understanding of assumptions, the rationale behind methodological choices, and the criteria employed for evaluating the appropriateness and effectiveness of selected techniques. Accordingly, research methodology functions as the scientific foundation guiding the entire research process. Moreover, methodology is inherently connected to the identification and operationalization of variables, as it informs how constructs are measured and analyzed within the chosen framework.

A variable is conceptualized as a measurable or observable attribute or characteristic that exhibits variation across individuals or entities under investigation. Variables are generally classified into three categories: independent, dependent, and extraneous. The independent variable (IV) is defined as the factor that is either manipulated, selected, or measured by the researcher, and is hypothesized to exert an influence on the dependent variable (DV)—the outcome or behavioral response under examination (Creswell, 2012; Singh, 2004). In contrast, extraneous variables (EV) refer to influencing factors that, although not central to the research focus, may affect the relationship between the IV and DV. Such variables may include demographic attributes, socio-economic background, or prior exposure to technology, and can potentially impact research outcomes.

In alignment with this conceptual framework, the present study focuses on psychological variables that are theorized to influence the adaptability of rickshaw drivers to digital technology. Specifically, the investigation centers on technological anxiety and perceived usefulness—the former conceptualized as a psychological barrier, and the latter as a facilitating belief—as antecedents of digital adaptability. The study seeks to examine the correlation and the extent to which these psychological dimensions contribute to or inhibit adaptability within the digital ecosystem. To ensure the accuracy and reliability of the findings, the study employs standardized psychometric instruments with established reliability and construct validity. The variables have been operationalized using the following instruments: technological anxiety was assessed using the Abbreviated Technology Anxiety Scale (ATAS) developed by Wilson et al. (2022); perceived usefulness was measured using a scale derived from the Technology

Acceptance Model (TAM), as originally conceptualized by Davis (1989); and adaptability was evaluated using the Adaptability Scale developed by Martin et al. (2012). These instruments, rooted in well-established theoretical frameworks and supported by prior empirical validation, provide a strong basis for psychological assessment in the present context.

OPERATIONAL DEFINITIONS

Technological anxiety

Technology anxiety is defined as the negative emotional response or apprehension experienced when using or anticipating the use of technology (Wilson et al., 2023), and was measured through the 11-item Abbreviated Technology Anxiety Scale (ATAS) assessing feelings of nervousness and avoidance toward Information and Communication Technology (ICT). In the consumer context, Meuter et al. (2003) described technological anxiety as “a tendency to be uneasy, apprehensive, or fearful about the current or future use of technology,” and designed a four-item scale for self-service systems such as ATMs, automated airline check-ins, or online shopping platforms. Razavi et al. (2024) similarly defined technological anxiety as “an emotional fear or apprehension that arises when individuals interact with technology,” particularly under pressure or evaluation, and validated a Persian version of the ATAS among Iranian university students. Fongang (2024) explained that technological anxiety is “the apprehension and unease rideshare drivers experience when smartphone technology influences their work performance.” In healthcare, Tsai et al. (2020) described technological anxiety as “a form of psychological discomfort experienced by individuals when interacting with technology,” assessing older adults' fears about wearable health-monitoring devices.

Perceived usefulness

Perceived usefulness has been defined in various studies as the degree to which individuals believe that using a particular system or technology can enhance their job performance or outcomes. In his seminal work, Davis (1989) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance." This concept was measured on 112 users, including MBA students and system users, at two organizations that had recently introduced computer systems. Later, Venkatesh et al. (2003) expanded on this definition, describing perceived usefulness as "the degree to which

an individual believes that using the system will help him or her to attain gains in job performance." Their study was conducted on employees across four organizations that were in the process of implementing new technology systems. More recently, Sun et al. (2024) defined perceived usefulness as "the extent to which a person believes that using a particular technology will enhance their performance or outcomes." Their research measured this concept on Chinese older adults (aged 60 and above) who were using smart healthcare devices.

Adaptability

Adaptability has been defined in various ways across different contexts. Pulakos et al. (2000) defined adaptability as "the ability to effectively adjust to work changes, new environments, and new job requirements." This definition was measured among U.S. working adults across multiple industries, including job incumbents, supervisors, and managers. Their study focused on the workplace and how individuals adapt to changes in their job roles and environments. On the other hand, Martin et al. (2013) defined adaptability as "an individual's capacity to adjust thoughts, feelings, and behaviors in response to uncertainty and novelty." This definition was explored among Australian high school students, aged 12 to 18, and examined how they adapt to the uncertainties and challenges of school and life.

RESEARCH OBJECTIVES

1. To identify the key psychological barriers in the form of technological anxiety that prevent rickshaw drivers from adopting new technologies.
2. To examine the relationship between technological anxiety and adaptability among rickshaw drivers.
3. To explore the relationship between the perceived usefulness of technology and adaptability among rickshaw drivers

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HYPOTHESES

- **H1:** Rickshaw drivers with prior experience using mobile technology or digital systems (e.g., smartphones, apps, GPS) will exhibit lower levels of technological anxiety and

greater adaptability to adopting new technology (e.g., mobile apps, GPS systems, electronic fare systems).

- **H2:** Higher levels of technological anxiety will negatively correlate with the adaptability of rickshaw drivers to new technological systems (e.g., mobile apps, GPS navigation systems).
- **H3:** The perceived usefulness of technology will positively correlate with the adaptability of rickshaw drivers to new technological systems (e.g., mobile apps, electronic payment systems).

SAMPLE

The study sample consisted of 20 rickshaw drivers operating either pedal rickshaws or electric rickshaws (2+1 seaters) within the inner lanes of South Kolkata, specifically spanning from the Patuli to Jadavpur region. Initially, 40 participants were approached for the study. Of these, 14 rickshaw drivers refused to participate despite owning smartphones (one of the criteria) due to concerns about union opposition. The drivers who voluntarily agreed to participate were provided with a consent form, and those who consented were given a questionnaire booklet to complete. However, 6 participants were unable to complete the questionnaire due to interruptions from incoming passengers, which made it difficult for them to continue. As a result, the final sample size for the study consisted of 20 rickshaw drivers.

Inclusion Criteria:

- Drivers who are willing to participate in the study
- Drivers with pedal rickshaws or e-rickshaws
- Drivers who have access to a smartphone
- Drivers who are 18 years old or above
- Drivers who have a minimum qualification of 7th grade

Exclusion Criteria:

- Drivers who are unwilling to participate in the study
- Drivers who do not have access to a smartphone

- Drivers who are below the age of 18

SAMPLING TECHNIQUES

The participants for this study were selected using a combination of convenience and purposive sampling techniques, both of which were justified given the challenges of identifying the exact population of rickshaw drivers in Kolkata. First, convenience sampling was used to collect data from participants who were readily accessible and willing to participate. This non-probability method, as described by Sedgwick (2013) and Saunders (2012), allowed for the selection of individuals based on their availability. For this study, rickshaw drivers working in the inner lanes of South Kolkata, specifically from Patuli to Jadavpur, were targeted to ensure a focused geographic sample that was both manageable and relevant to the purpose of the research. After gathering an initial pool of participants through convenience sampling, purposive sampling refined the sample by intentionally selecting individuals who met specific criteria relevant to the study's objectives. As noted by Kelly (2010), purposive sampling was ideal for selecting participants who were likely to provide valuable insights into the research question. In this case, the sample consisted only of rickshaw drivers who operated paddle-driven or battery-operated rickshaws, owned smartphones, and had the minimum required educational qualifications. This ensured that participants had the technological experience required for the study, making them more likely to provide meaningful data on the factors influencing digital adoption and adaptability.

RESEARCH DESIGN

This study employed a quantitative research design, focusing on quantifying variables and using statistical analysis to systematically test hypotheses. Standardized data collection tools and numerical data were used to objectively explore the relationships among Technological Anxiety (TAS), Perceived Usefulness (PU), and Adaptability (ADAPT) among rickshaw drivers who use smartphones and digital payment systems. A correlational research design was specifically chosen to examine whether changes in one variable are associated with changes in another without manipulating any variables (Abbott & McKinney, 2013; Marczyk et al., 2010).

In such studies, relationships can be positive, negative, or nonexistent, but it is important to remember that correlation does not imply causation. To gather data efficiently and systematically, survey research was used, where information was collected from a sample of individuals based on their responses to structured questions (Check & Schutt, 2012)

TOOLS TO BE USED

1. Abbreviated Technology Anxiety Scale (ATAS)

The Abbreviated Technology Anxiety Scale (ATAS) was developed by Wilson, Huggins-Manley, Ritzhaupt, and Ruggles (2022). It consists of 11 items designed to assess the negative emotional response individuals experience when considering or using modern information and communication technologies (ICTs). The ATAS was developed through a systematic three-phase process involving expert reviews, pilot studies, and confirmatory factor analyses to ensure validity and reliability. It addresses the limitations of earlier computer anxiety measures by capturing a wider range of technological experiences, including mobile devices, apps, and internet-enabled tools. The ATAS has shown strong psychometric properties, supporting its use in low-stakes research settings to identify and measure technology-related anxiety.

Administration:

The ATAS is a self-administered questionnaire that participants can complete either online or on paper. Participants are asked to reflect on their feelings and experiences with different forms of technology. They then rate their level of agreement with 11 statements about their discomfort or nervousness toward using digital technologies. Clear instructions are provided to emphasize voluntary participation and to encourage honest responses so that their technology anxiety levels are accurately captured.

Scoring:

The ATAS consists of 11 items, each rated on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree). Each response is assigned a value between 1 and 5, and the scores are either summed or averaged to produce a total technology anxiety score. The minimum possible score is 11, indicating low technology anxiety, while the maximum score is 55, indicating high technology anxiety.

Interpretation:

A lower ATAS score suggests minimal or no technology anxiety, meaning the individual feels comfortable using ICTs. In contrast, a higher score suggests greater technology anxiety, reflecting discomfort, apprehension, or fear related to using or learning about new technologies. The ATAS has demonstrated excellent internal consistency reliability, with an omega value of 0.95 and a Cronbach's alpha of 0.91. It also has strong validity evidence based on its correlations with related constructs such as attitudes toward technology, general anxiety, technology self-efficacy, and frequency of technology use.

2. Perceived Usefulness Scale (PU)

The Perceived Usefulness (PU) Scale was created by Davis (1989) during his groundbreaking research on the Technology Acceptance Model (TAM). This scale is intended to evaluate how strongly an individual believes that using a specific information system will improve their job performance. Davis (1989) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance." The PU Scale was developed through theoretical modeling based on behavioral theories related to user acceptance, followed by empirical testing involving 152 participants across four different software tools. The primary aim of the scale is to capture users' motivation to adopt technology based on the benefits it offers, rather than the effort needed to use it. Although Davis also introduced the concept of Perceived Ease of Use, the current study focuses exclusively on perceived usefulness, emphasizing outcomes and effectiveness rather than ease of use.

Administration:

The PU Scale is a self-completed questionnaire where participants are asked to reflect on how a particular technology influences their job performance, productivity, and efficiency. Responses are gathered confidentially, either through online platforms or paper-based surveys. Participants receive clear instructions that highlight the importance of providing honest and thoughtful answers regarding the perceived utility of the system in their work tasks.

Scoring:

The PU Scale includes 6 items, each rated using a 7-point Likert scale (ranging from 7 = Extremely Likely to 1 = Extremely Unlikely). Each item response is assigned a numerical value between 7 and 1. The overall score is calculated by summing all six item responses. A minimum

score of 6 indicates low perceived usefulness, while a maximum score of 42 suggests high perceived usefulness.

Interpretation:

Higher PU scores indicate a stronger belief that the system contributes positively to job performance, which in turn suggests a greater likelihood of accepting and continuing to use the technology. The scale shows excellent internal reliability, with a Cronbach's Alpha of 0.98. It also demonstrates strong predictive validity, with perceived usefulness showing significant correlations with both actual system usage (r = .63) and self-reported intention for future use (r = .85).

3. Adaptability Scale

Developed by Martin, Nejad, Colmar, and Liem (2013), the Adaptability Scale aims to measure individuals' ability to adjust across cognitive, emotional, and behavioral domains when confronted with uncertainty or novelty. Adaptability, as defined in the scale, refers to "appropriate cognitive, behavioral, and/or affective adjustment in the face of uncertainty and novelty." The scale underwent a thorough psychometric evaluation, which included exploratory and confirmatory factor analyses with adolescent populations. The scale's primary goal was to provide a reliable and valid instrument to assess how individuals manage new, unpredictable, or changing environments, with a particular focus on academic and developmental settings.

Administration

The Adaptability Scale is designed as a self-report tool, where participants are asked to reflect on and respond to items that describe their typical reactions to situations involving uncertainty or change. Each statement prompts individuals to think about how they adjust their thoughts, behaviors, and emotions in the face of unpredictability. The questionnaire can be administered either digitally or on paper, ensuring confidentiality to foster honest responses. Participants are provided with clear instructions, emphasizing that participation is voluntary and encouraging them to base their answers on personal experiences with change and novelty.

Scoring

The scale consists of 9 items, each rated on a 7-point Likert scale with the following values: 1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree nor Disagree,

5 = Somewhat Agree, 6 = Agree, and 7 = Strongly Agree. The overall adaptability score is calculated by summing the scores from all nine items. The possible total score range extends from 9 (indicating low adaptability) to 63 (indicating high adaptability).

Interpretation

A higher total score on the Adaptability Scale indicates greater adaptability, suggesting that an individual is more capable of adjusting their cognitive, emotional, and behavioral responses to novel or uncertain situations. The scale has demonstrated strong psychometric reliability, with a Cronbach's alpha coefficient of 0.86, as well as solid validity supported by factor structure analyses, confirming its usefulness in research on resilience, personal development, and academic achievement.

4. Questionnaire Consent Form

Participants will be provided with a consent form that they must sign with their initials after reviewing the study details and understanding their role. This process ensures that informed consent is obtained before participation.

PROCEDURE

Data collection was conducted over a three-month period, from February to April 2025, across the Patuli to Jadavpur region of Kolkata. The researcher physically approached various rickshaw stands, establishing rapport with each rickshaw driver encountered. Efforts were made to create a non-intimidating and respectful environment to foster open and honest communication. Eligibility criteria were verified prior to participation Eligible participants were provided with a comprehensive briefing on the purpose of the study. They were explicitly informed that participation was entirely voluntary and that refusal to participate would incur no negative consequences. Participants were also assured that all information provided would remain confidential and be used solely for research purposes, encouraging candid responses. Written informed consent was obtained from all participants before data collection proceeded. After obtaining consent, participants were given detailed instructions on completing the study questionnaires and scales. The researcher remained available throughout the process to address

any queries or concerns. Upon completion, all data were systematically collected for statistical analysis.

STATISTICAL ANALYSIS

The data analysis plan for the present study was executed using IBM SPSS Statistics software. Both descriptive and correlational statistical procedures were pre-decided in accordance with established methodological standards for hypothesis testing.

Phase 1: Assessment of Normality

As a preliminary step, the distribution of the study variables was assessed for normality. The Shapiro–Wilk test was used due to its superior power properties for small sample sizes ($N < 50$), as was the case in the present study (Shapiro & Wilk, 1965). Given the uncertainty regarding the underlying population distribution, any significant deviation from normality would necessitate the application of non-parametric methods in subsequent phases of analysis to ensure the validity of statistical inferences.

Phase 2: Descriptive Statistics

Following the normality assessment, descriptive statistics were computed for all key variables to summarize measures of central tendency and dispersion. Specifically, mean, median, mode, and standard deviation were calculated.

Phase 3: Correlational Analysis

If the assumption of normality was violated, Spearman's rank-order correlation coefficient (Spearman, 1904) would be used in place of Pearson's correlation coefficient (Pearson, 1895), as the distribution of the rickshaw driver population was unknown and there was no prior evidence regarding the count or distribution of rickshaw drivers. Accordingly, Spearman's rank correlation analysis was conducted to examine the following relationships:

- Between technological anxiety and adaptability,
- Between perceived usefulness and adaptability, and
- Between technological anxiety and perceived usefulness

Chapter IV

RESULTS AND DISCUSSION

RESULTS

Table 1 presents the results for normality, conducted to assess the distribution of the key variables—Technological Anxiety (TAS), Perceived Usefulness (PU), and Adaptability (ADAPT)—in a sample of rickshaw drivers ($N = 20$) who have access to digital gadgets like smartphones and use digital payment methods.

VARIABLES	SHAPIRO-WILK TEST		
	Statistic	df	Sig.
TAS	.978	20	.904
PU	.952	20	.405
ADAPT	.877	20	.016

TABLE 1: Values of Shapiro-Wilk normality test result for the following variables: TAS, PU and ADAPT

Table 1 reveals the results of the Shapiro-Wilk test, which was conducted to examine the normality of distribution across the key study variables: Technological Anxiety (TAS), Perceived Usefulness (PU), and Adaptability (ADAPT). The results indicate that both TAS and PU did not significantly deviate from a normal distribution, as their p-values exceeded the .05 threshold (TAS: $p = .904$; PU: $p = .405$). However, the variable ADAPT exhibited a significant departure from normality ($p = .016$), suggesting a non-normal distribution. Given that the sample size in this case was below 30 ($N = 20$), these results warrant caution, and non-parametric tests were employed to ensure the robustness of the findings despite the violation of normality in the dependent variable.

Below are the histograms with normal curve overlays, visually representing the distribution patterns for Technological Anxiety (TAS), Perceived Usefulness (PU), and Adaptability (ADAPT) scores among the participants:

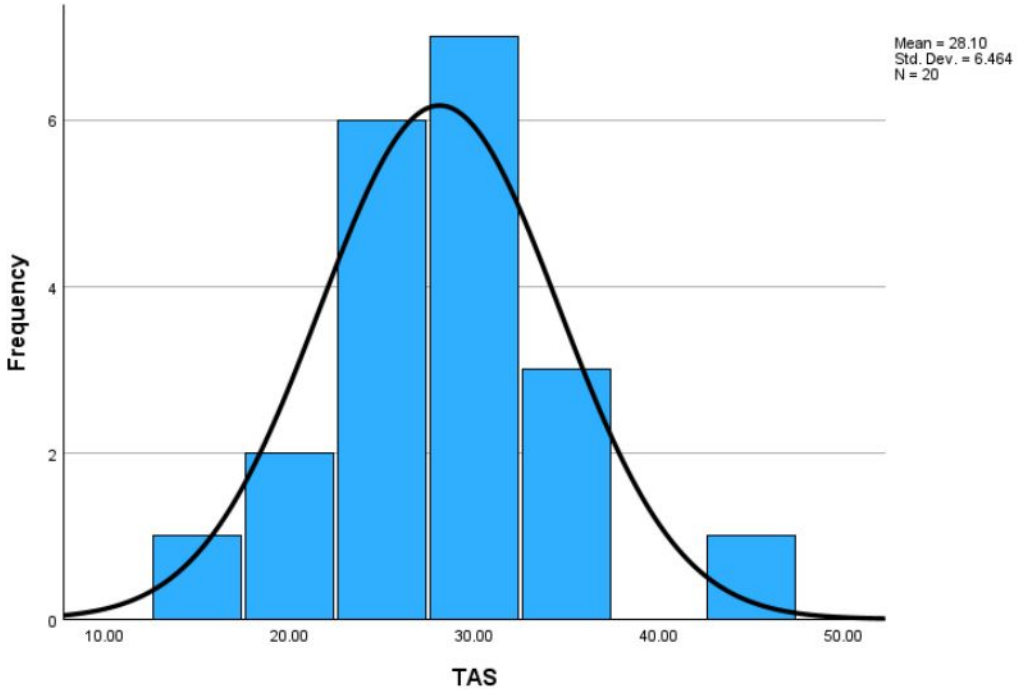

Fig. 1: Distribution of Technological Anxiety Scores (TAS) among Participants (N = 20)

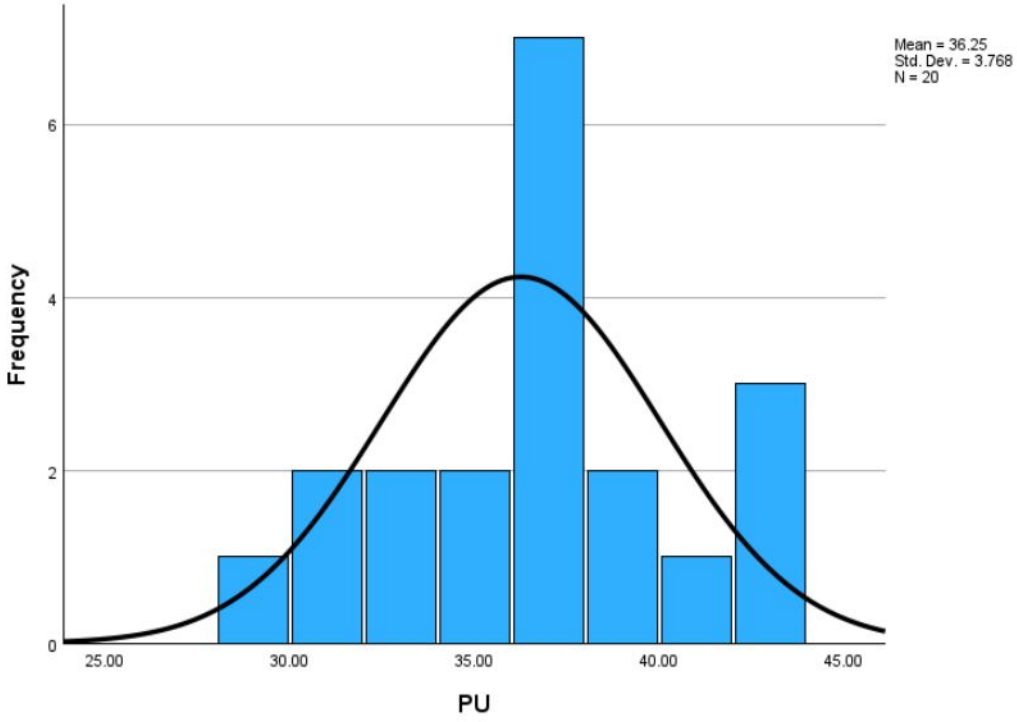

Fig.2: Distribution of Perceived Usefulness (PU) Scores among Participants (N = 20)

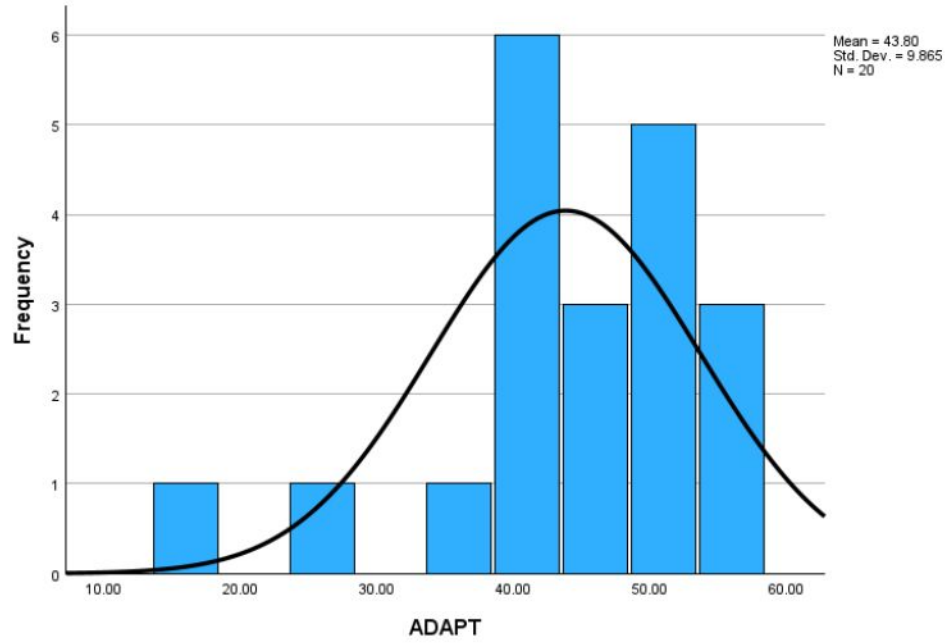

Fig.3: Distribution of Adaptability Scores (ADAPT) among Participants (N = 20)

TABLE 2 presents the descriptive statistics was computed for the variables to examine the data's central tendency and variability.

Table 2: Values of Mean and Standard Deviation in respect to all variables: TAS, PU and ADAPT

		STATISTIC	**STD. ERROR**
TAS	MEAN	28.1000	1.44532
	STD. DEVIATION	6.46366	
PU	MEAN	36.2500	.84254
	STD. DEVIATION	3.76794	
ADAPT	MEAN	43.4172	2.20597
	STD. DEVIATION	9.86541	

Table 2 presents the descriptive statistics for the study variables. The mean score for Technological Anxiety (TAS) was 28.10 (SD = 6.46), indicating a moderate level of anxiety among rickshaw drivers. Perceived Usefulness (PU) had a mean of 36.25 (SD = 3.77), reflecting a generally high perception of digital tools' usefulness. Adaptability (ADAPT) showed a mean of 43.42 (SD = 9.87), suggesting a relatively strong adaptability among participants- as graphically presented in Fig. 4.

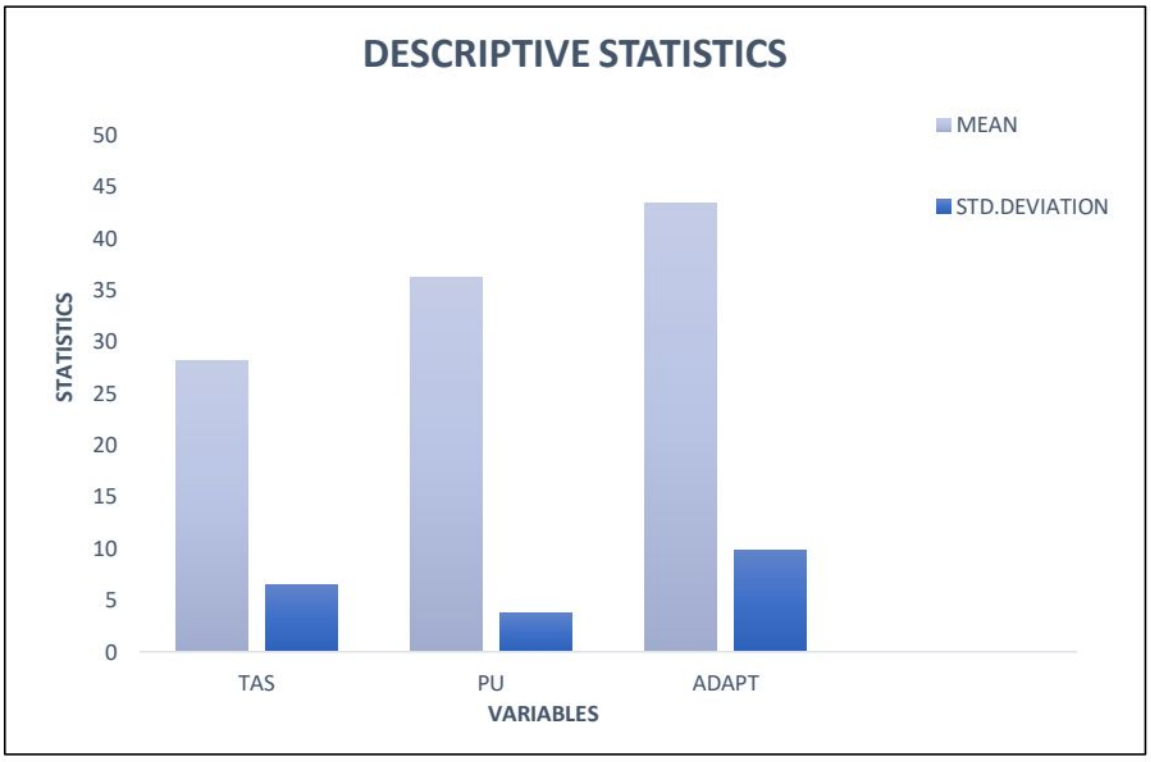

Fig. 4

Table 3 and Table 4 present the results of the correlation analysis, which was conducted to explore the strength and direction of the relationships among the variables: TAS, PU and ADAPT.

Table 3: Pearson's Correlation Between TAS, PU, and ADAPT

		TAS	PU	ADAPT
TAS	Pearson Correlation	1	-448*	-.407
	Sig. (2-tailed)		047	.075
	N	20	20	20
PU	Pearson Correlation	-448*	1	.389
	Sig. (2-tailed)	047		.090
	N	20	20	20
ADAPT	Pearson Correlation	-.407	.389	1
	Sig. (2-tailed)	.075	.090	
	N	20	20	20
*. Correlation is significant at the 0.05 level (2-tailed).				

Table 4: Spearman's Correlation Between TAS, PU, and ADAPT

	Spearman's rho	TAS	PU	ADAPT
TAS	Correlation Coefficient	1.000	-.500*	-.547*
	Sig. (2-tailed)	.	.025	.013
	N	20	20	20
PU	Correlation Coefficient	-.500*	1.000	.620**
	Sig. (2-tailed)	.025	.	.004
	N	20	20	20
ADAPT	Correlation Coefficient	-.547*	.620**	1.000
	Sig. (2-tailed)	.013	.004	.
	N	20	20	20
*. Correlation is significant at the 0.05 level (2-tailed).				
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 3 reveals a moderate negative correlation between TAS and ADAPT (r = -0.407), though this relationship is not statistically significant (p = 0.075). Furthermore, a significant negative correlation is observed between TAS and PU (r = -0.448, p = 0.047), suggesting that higher levels of technological anxiety are associated with a lower perceived usefulness of technology. The correlation between PU and ADAPT shows a positive relationship (r = 0.389), but it does not reach statistical significance (p = 0.090).

As seen in Table 4, Spearman's rho analysis yields more robust findings. A moderate negative correlation is observed between TAS and ADAPT (ρ = -0.547), which is statistically significant (p = 0.013), confirming that greater technological anxiety is associated with lower adaptability. The relationship between TAS and PU is also significant (ρ = -0.500, p = 0.025), indicating that increased anxiety correlates with lower perceived usefulness. Moreover, a strong positive correlation is found between PU and ADAPT (ρ = 0.620, p = 0.004), which is statistically significant at the 0.01 level, suggesting that higher perceived usefulness is linked to greater adaptability.

DISCUSSION

The present study aimed to examine the role of Technological Anxiety (TAS) and Perceived Usefulness (PU) in predicting Adaptability (ADAPT) among rickshaw drivers integrating smartphones and digital payment systems into their work routines. Analyses involved normality testing, descriptive statistics, and correlational analyses, incorporating both Pearson's and Spearman's rank-order correlations to comprehensively address the stated hypotheses.

Normality of Data Distributions

Given the small sample size (N = 20), the Shapiro–Wilk test was used to assess the normality of distributions. TAS (p = .904) and PU (p = .405) satisfied normality assumptions. However, ADAPT showed significant deviation (p = .016). As a result, Spearman's rho, a non-parametric measure suited for non-normal and monotonic relationships, was employed alongside Pearson's correlations. This methodological choice enhanced the robustness of the findings,

particularly given the real-world heterogeneity of the sample, an approach aligned with recommendations by Meuter et al. (2003) for non-standard user populations.

Descriptive Statistics

The descriptive statistics offered key insights into the psychological profiles of the participants. The mean TAS score (M = 28.10, SD = 6.46) reflected moderate technological anxiety, consistent across participants. This supports Hypothesis 2 (H2), suggesting that technological anxiety could act as a barrier to adaptability. Wilson et al. (2023) similarly found that higher technological anxiety correlated with lower technological self-efficacy (r = -0.47) and negative attitudes (r = -0.65) among students, highlighting anxiety's undermining effect on confidence with digital tools. However, while Wilson's findings were limited to university settings, the present study extends their validity to informal, low-literacy occupational groups like rickshaw drivers.

Perceived Usefulness (PU) displayed a mean score of 36.25 (SD = 3.77), suggesting a strong, consistent belief in the benefits of technology among the sample. This aligns with Davis (1989) original Technology Acceptance Model (TAM) where PU emerged as a stronger predictor of system use (r = .63, .85) compared to perceived ease of use. Similarly, Bolodeoku et al. (2022) found that perceived usefulness significantly influenced productivity and satisfaction in organizational contexts. By demonstrating a similar pattern in an informal workforce, this study extends the TAM's applicability beyond professional and structured environments, confirming Hypothesis 3 (H3).

The Adaptability (ADAPT) mean score (M = 43.42, SD = 9.87) revealed high adaptability levels despite technological anxiety. This finding supports Hypothesis 1 (H1), suggesting that prior exposure to mobile technologies fosters greater resilience and flexibility. Martin et al. (2013) previously highlighted adaptability's positive association with emotional regulation and academic engagement among students. The current study's findings strengthen Martin et al.'s framework by confirming that adaptability is equally critical for occupational adjustment among adult workers outside of academic contexts.

Additional Contributions Beyond Past Research

Importantly, this study resolved several limitations cited in prior research. While earlier studies such as Wilson et al. (2023) and Davis (1989) primarily involved academically inclined or corporate participants, this investigation included a marginalized, underrepresented informal workforce operating in unpredictable, non-digital environments. Furthermore, it moved beyond static desktop systems by focusing on mobile and app-based technologies, a direction encouraged but not fully explored in studies like Meuter et al. (2003) and Tsai et al. (2020). By integrating real-world occupational experiences with psychological constructs, this research adds vital ecological validity to the existing technology adoption models. It also highlights that adaptability and perceptions of usefulness can counterbalance technological anxiety, even among users with minimal formal training.

Interpretation of Correlation Findings

Spearman's rho revealed a statistically significant moderate negative correlation between TAS and ADAPT ($\rho = -0.547$, $p = .013$), strongly supporting Hypothesis 2. This indicates that greater technological anxiety inhibits adaptability, echoing Meuter et al. (2003), who found that anxiety dampens consumers' satisfaction and use of self-service technologies. While Meuter's findings were limited by a potential online sampling bias, this study corrects for that by working with participants directly embedded in offline, everyday contexts.

A strong positive correlation between PU and ADAPT ($\rho = 0.620$, $p = .004$) confirmed Hypothesis 3, emphasizing that recognizing tangible benefits is crucial for successful digital integration. Sun et al. (2024) also demonstrated that perceived usefulness boosts willingness to adopt smart healthcare devices, with technology interactivity acting as a mediator. Our findings reinforce Sun et al.'s conclusion, emphasizing that making the utility of technology apparent can drive adaptive behaviors even among non-traditional users like rickshaw drivers.

Additionally, a moderate negative correlation between TAS and PU ($\rho = -0.500$, $p = .025$) was observed, although not hypothesized. This finding parallels the meta-analytic results of Dönmez-Turan and Kır (2019), who reported a negative effect of anxiety on perceived usefulness ($\bar{r} = -0.139$). While Dönmez-Turan and Kır focused on studies drawn primarily from formal organizational settings, our results underscore that this relationship persists in highly fluid, informal economic environments as well.

Chapter V

CONCLUSION AND IMPLICATION OF RESEARCH

LIMITATIONS OF THE STUDY

Several constraints must be acknowledged when interpreting the findings of this dissertation on Technological Anxiety (TAS), Perceived Usefulness (PU), and Adaptability (ADAPT) among rickshaw drivers in Kolkata:

Small and Non-Representative Sample

The study included only 20 rickshaw drivers from a specific part of South Kolkata. Because the sample size was small and the location was limited, the findings may not represent the experiences of all rickshaw drivers in the city or in other areas.

Cross-Sectional Design

The study collected data at one point in time. As a result, it can show associations between technological anxiety, perceived usefulness, and adaptability, but it cannot prove cause-and-effect relationships or show changes over time.

Self-Report Bias

All information was collected through self-reported questionnaires. This method may lead to biased answers, as participants might have responded in socially desirable ways or might not have accurately remembered their experiences.

Aggregation of App Features

The study considered ride-calling apps as a whole and did not separate different features such as GPS navigation, fare transparency, or support systems. However, each feature might affect drivers' anxiety and adaptability differently, which this study could not explore.

Limited Real-Life App Experience

Since there are currently no ride-calling apps specifically for rickshaws in Kolkata, most drivers have little or no prior experience using similar platforms. This lack of real-world experience might have influenced their responses based more on assumptions rather than actual use.

FUTURE DIRECTIONS

Building upon the findings, future studies should consider:

Long-Term Studies

Future investigations could track the same group of drivers over an extended period to examine how their technological apprehension, adaptability, and perceived utility of the app evolve. Such studies would provide insight into the long-term impact of app usage, including shifts in driver behavior, satisfaction, and adoption patterns.

Impact of Specific Features

Future studies should analyze the influence of individual app features, such as GPS navigation, payment transparency, and customer support, on drivers' anxiety and adaptability. This would clarify which features are most effective in reducing technological concerns and improving the overall user experience.

Comparative Analysis of Adoption

A comparative study could evaluate the outcomes for rickshaw drivers using the app versus those not using it. Key metrics such as income, operational efficiency, and satisfaction would provide a clearer understanding of the app's tangible benefits and the challenges faced during its adoption.

Expanding to Other Locations

While this study focused on South Kolkata, future research could extend to other areas of the city, including suburban and peri-urban regions. This would help assess whether the findings are consistent across different geographical contexts and if drivers in various areas encounter distinct barriers to technology adoption.

Effectiveness of Digital Training Initiatives

Further research should assess the impact of digital training programs on reducing drivers' technological anxiety and enhancing adaptability. By exploring different training methods,

such as in-person workshops, online tutorials, or peer mentoring, researchers can identify the most effective strategies for facilitating smoother adoption of technology.

APPLICABILITY OF THE STUDY

This research offers actionable insights for various stakeholders committed to bridging the digital divide in informal transport:

Creation of a Rickshaw Ride-Calling App

The findings of this study offer valuable insights for developing a ride-hailing app tailored to rickshaw drivers in Kolkata. Understanding the drivers' technological apprehensions and adaptability enables developers to design a more user-centric app that addresses their specific needs, ensuring smoother adoption and reducing potential barriers.

Designing an Intuitive User Interface

A key takeaway from this study is the importance of simplicity in app design. By prioritizing a clear, straightforward interface with minimal steps, the app can reduce the anxiety associated with technology, particularly for users with varying levels of digital literacy. This approach aligns with the study's findings, which suggest that drivers are more inclined to adopt technology that is easy to navigate, facilitating a quicker and more comfortable learning curve.

Digital Literacy Programs for Drivers

The research underscores a gap in digital skills among rickshaw drivers, highlighting the need for targeted educational initiatives. Collaboration among NGOs, local governments, and tech companies could lead to the creation of digital literacy workshops, which would help drivers become more familiar with smartphones and apps, thereby easing their transition and reducing technological apprehension.

Comprehensive Driver Support and Assistance Systems

Given the anxiety observed among drivers, future ride-hailing apps should incorporate reliable support mechanisms. In-app features such as real-time assistance, chat support, or FAQs could

provide immediate help and reassurance, building drivers' confidence and encouraging consistent app usage.

Policy Frameworks for Digital Inclusion

The study's outcomes can guide policymakers in addressing the digital needs of informal workers, such as rickshaw drivers. Insights from this research can inform policies promoting digital inclusion, including subsidizing smartphones, providing affordable internet access, or partnering with tech companies to offer accessible solutions, ensuring these workers are integrated into the digital economy.

CONCLUSION

As this exploration into the technological transitions faced by rickshaw drivers in South Kolkata comes to a close, it becomes evident that this study was not merely an examination of technological anxiety, perceived usefulness, and adaptability; it became a window into the daily struggles and quiet hopes of workers negotiating the tides of a rapidly digitalizing world.

Throughout the study, it was revealed that technological anxiety among rickshaw drivers was not a sign of unwillingness to change, but rather a reflection of systemic neglect. Despite limited exposure and frequent frustrations, many drivers displayed remarkable adaptability and a willingness to evolve when technology offered real, tangible advantages. Technological anxiety did not represent resistance to progress; instead, it highlighted a deep gap in inclusion and understanding. Their apprehensions stemmed not from inability, but from the absence of systems designed with their realities in mind. Nevertheless, their adaptability shone through—demonstrating a strong willingness to learn and evolve when given the proper support.

The findings further emphasized that perceived usefulness acts as a crucial bridge between fear and adoption. When technology presents genuine benefits—saving time, ensuring fair payment, and offering greater dignity—adaptation tends to follow naturally. Drivers responded to such benefits with cautious but genuine acceptance.

Ultimately, this dissertation stands as a small step towards providing a platform to the rickshaw community—a community that has carried the weight of the city for generations, yet has often remained invisible in discussions of modernity. True digital transformation, as suggested by the study, must be measured not only by the innovations it brings but by the lives it chooses to uplift.

Chapter VI

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PLAGIARISM CERTIFICATE

"I, Debasmita Roy, hereby declare that the research work titled, "TECHNOLOGICAL ANXIETY, PERCEIVED USEFULNESS AND ADAPTIBILITY AMONG RICKSHAW DRIVERS", conducted by me, has been completed with full honesty and integrity. I confirm that the work is original, and all sources of information have been appropriately acknowledged and cited. Furthermore, I affirm that the research work has undergone thorough plagiarism checks to ensure its authenticity."

Signature Debasmita Roy

Date: 30.4.25

Name: DEBASMITA ROY

Enrolment ID: 2322230002002

Program and Semester: M.Sc in Applied Psychology

Semester: 4

Year: 2025

Chapter VII

APPENDICES

APPENDIX A

QUESTIONNAIRE CONSENT FORM

I hereby agree to voluntarily participate in the present research study conducted by Debasmita Roy of Sister Nivedita University, Newtown, West Bengal. I understand that all information will be kept confidential and will be used for academic purposes only.

Signature: Date:

About the Researcher:
Debasmita Roy
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Supervisor: Asst. Prof. Bipasha Chatterjee
Institutional Contact: Sister Nivedita University

APPENDIX B

SOCIO-DEMOGRAPHIC DETAILS

Name (Initials):

Age:

Address:

Mother Tongue:

Education level:

Years of work experience:

Residence:

Marital Status:

What is your rickshaw type?

Do you take online payment?

Signature of Participant:

Signature of Researcher:

Date:

APPENDIX C

Abbreviated Technology Anxiety Scale (ATAS)

Thank you for taking time to complete the Abbreviated Technology Anxiety Scale (ATAS). This scale gauges one's technology anxiety. Please respond to each prompt with the appropriate level of agreement per your personal feelings about yourself and technology. Reflective and open responses are encouraged and appreciated. As a participant, your name will not be associated with your responses. The responses you provide will be confidential. Thank you.

SD = Strongly Disagree, D = Disagree, N = Neither Disagree nor Agree, A = Agree, SA = Strongly Agree

	SD	D	N	A	SA
I am not a technology person					
I am reluctant to learn new features of technology					
I am uncomfortable using technology					
Technology does not improve my quality of life					
I feel out of control using technology					
I feel uneasy using technology					
I feel technology complicates simple tasks					
Keeping up with the newest technology is impossible					
I am inefficient with technology					
Using technology makes me nervous					
I am often annoyed when using technology					

APPENDIX D

PERCEIVED USEFULNESS (PU)

Perceived Usefulness (PU)	**Likely**						**Unlikely**
	Extremely	*Quite*	*Slightly*	*Neither*	*Slightly*	*Quite*	*Extremely*
1. Using [this product] in my job would enable me to accomplish tasks more quickly.							
2. Using [this product] would improve my job performance.							
3. Using [this product] in my job would increase my productivity.							
4. Using [this product] would enhance my effectiveness on the job.							
5. Using [this product] would make it easier to do my job.							
6. I would find [this product] useful in my job.							

APPENDIX E

The Adaptability Scale (Martin, Nejad, Colmar, & Liem, 2012)

Please read each statement carefully and indicate the extent to which you agree or disagree by selecting a number from 1 to 7, based on the scale provided below:

1. *Strongly Disagree*
2. *Disagree*
3. *Somewhat Disagree*
4. *Neither Agree nor Disagree*
5. *Somewhat Agree*
6. *Agree*
7. *Strongly Agree*

	ITEM STATEMENTS	1	2	3	4	5	6	7
1.	I am able to think through a number of possible options to assist me in a new situation.							
2.	I am able to revise the way I think about a new situation to help me through it.							
3.	I am able to adjust my thinking or expectations to assist me in a new situation.							
4.	I am able to seek out new information, helpful people, or useful resources to effectively deal with new situations.							
5.	In uncertain situations, I am able to develop new ways of going about things (e.g., a different way of asking questions or finding information) to help me through.							
6.	To assist me in a new situation, I am able to change the way I do things.							
7.	I am able to reduce negative emotions (e.g., fear) to help me deal with uncertain situations.							
8.	When uncertainty arises, I am able to minimize frustration or irritation so I can deal with it best.							
9.	To help me through new situations, I am able to draw on positive feelings and emotions (e.g., enjoyment, satisfaction).							